CLAIMS

What is claimed is:

1. A method of manufacturing a transducer, the method comprising the steps of:

providing a substrate assembly;

making aperture isolation cuts in said substrate assembly in a first direction;

making minor element cuts in said substrate assembly in a second direction;

positioning a plurality of signal lines on said substrate assembly such that said plurality of signal lines is aligned with said minor element cuts;

making major element cuts in said substrate assembly in said second direction after said plurality of signal lines is positioned to create a multi-element transducer assembly.

2. The method of claim 1 wherein said step of providing said substrate assembly comprises the steps of:

preparing a piezoelectric assembly;

preparing a matching layer assembly; and

attaching said piezoelectric assembly to said matching layer assembly to create said substrate assembly.

3. The method of claim 2 wherein the step of preparing said matching layer assembly comprises the steps of:

forming at least one matching layer on a conducting layer;

forming cuts in through said at least one matching layer in said first direction; and

filling said cuts in said at least one matching layer with an acoustically-attenuative material.

4. The method of claim 3 wherein said step of preparing said piezoelectric assembly comprises:

applying a conducting layer to a substrate material; and

forming isolation cuts in said substrate material in said first direction.

5. The method of claim 4 wherein said step of attaching said piezoelectric assembly to said matching layer assembly comprises aligning said cuts in said at least one matching layer with said isolation cuts in said substrate material.

6. The method of claim 5 further comprising filling said isolation cuts in said substrate material with said acoustically-attenuative material.

7. The method of claim 4 further wherein said step of preparing said piezoelectric assembly further comprises forming composite cuts in said substrate material.

8. The method of claim 7 wherein said composite cuts are made in said first direction.

9. The method of claim 1 wherein said plurality of signal lines comprise a flex circuit.

10. The method of claim 9 wherein the step of positioning said plurality of signal lines on said substrate assembly comprises:

forming a mark on said flex circuit; and

aligning said mark to one of said minor element cuts in said substrate assembly.

11. The method of claim 1 wherein the distance between said cuts in said first direction is determined by the minimum integrated absolute time delay error method.

12. A transducer manufactured by the method of claim 1.

13. A transducer manufactured by the method of claim 2.

14. A transducer manufactured by the method of claim 5.

15. A transducer manufactured by the method of claim 10.

16. A multi-dimensional transducer having a plurality of elements, said transducer comprising:

a conductor;

a piezo-electric assembly on a first side of said conductor, said piezo-electric assembly having a first plurality of cuts in a first direction;

a matching layer assembly having a second plurality of aperture cuts in said first direction, wherein said matching layer is coupled to said conductor opposite said piezo-electric assembly such that said first

and second pluralities of elevation cuts are aligned to isolate said plurality of elements in an elevation dimension.

17. A multi-dimensional transducer according to claim 16 wherein each of said first and second pluralities of cuts is filled with an acoustically-attenuative material.

18. A multi-dimensional transducer according to claim 17 wherein said piezo-electric assembly further comprises a plurality of cuts in a second direction.

19. A multi-dimensional transducer according to claim 18 wherein said plurality of cuts in said second direction isolate said plurality of elements in an azimuth direction.

20. A multi-dimensional transducer according to claim 18 wherein said plurality of cuts in said second direction comprise major element cuts that isolate said plurality of elements in an azimuth direction.

21. A multi-dimensional transducer according to claim 20 wherein said plurality of cuts in said second direction further comprises a plurality of minor element cuts.

22. A multi-dimensional transducer according to claim 21 further comprising a plurality of signal leads, wherein each of said plurality of signal leads is coupled to one of said plurality of elements.

23. A multi-dimensional transducer according to claim 22 wherein said plurality of signal leads comprises a flex circuit.

24. A multi-dimensional transducer according to claim 23 wherein said flex circuit is coupled to said transducer prior to the cutting of said plurality of major element cuts.